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10/070,908	07/12/2002	Makoto Yoneya	220523US0PCT	2995

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EXAMINER

NGUYEN, HOAN C

ART UNIT PAPER NUMBER

2871

DATE MAILED: 10/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/070,908

Applicant(s)

YONEYA ET AL.

Examiner

HOAN C. NGUYEN

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 31 July 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 2,8-20 and 22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3-7 and 21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Response to Amendment*

Applicant's arguments with respect to claims 1, 3-7 and 21 based on the Response filed on 7/31/2006 have been considered but in the same ground(s) of rejection. Therefore, this is Final action.

Claims 2, 8-20 and 22 are withdrawn.

Claim 1 cited feature "group of interdigitated electrodes". However, Kim et al. disclose a **nematic** liquid crystal cell with In-Plane Switching mode (col. 6 line 32); which **inherently** includes "group of interdigitated electrodes" as disclosed in Tomioka et al. (US6682783B1).

Figure 14 of Kim et al. disclose (a) a first alignment layer 8 (Figs. 14a-c) is made of polyimide and is rubbed by mechanical with low pretilt angle (almost 0°) as Figs. 11a-b shown; (b) a second alignment layer 9 (Figs. 14d-l) is made of photo-polymers including polysioxance and rubbed by UV light with low pretilt angle near to 0° if the photo energy more than 6000mJ/cm (Fig. 4, col. 5 lines 30-32).

The second alignment layer 9 in Figures 11c-f and 14d-i can be aligned by the UV light of any energy from 2000-12000 mJ/cm<sup>2</sup>, which describes in Figure 4. However, in Fig. 11c-f, the second alignment layer 9 formed two domains of the high-photo-energy to provide low pretilt angle less than 5° (col. 6 lines 50-55). Therefore, examiner believes Kim et al. disclose all features of all elected claims.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1, 3-7 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Kim et al. (US6091471A).

In regard to claims 1, Kim et al. teach (Figs. 4, 10-14) a liquid crystal display device comprising

- a pair of substrates, at least one of which is inherently transparent for transmitting light through LC cell so that light can be modulated;
- a nematic liquid crystal between the pair of substrates as Figs. 10a-b shown.
- a In-Plane Switching (col. 6 line 32) mode liquid crystal cell as inherently a group of interdigitated electrodes
  - formed on at least one of substrates and
  - adapted to apply an electric field to the liquid crystal layer, wherein the electric field inherently having a component substantially parallel to the surfaces due to a In-Plane Switching (IPS) mode liquid crystal cell;
- an alignment layer
  - disposed between the liquid crystal layer and at least one of substrates;
  - having been subjected to liquid crystal anchoring treatments (col. 5 lines 53-55) in plural directions to form a plurality of liquid crystal in-plane

anchoring directions as Fig. 14 with the photo energy more than 6000mJ/cm (Fig. 4, col. 5 lines 30-32), thereby forming a plurality of liquid crystal in-plane anchoring directions.

wherein

- two of liquid crystal in-plane anchoring directions of the alignment layer form substantially equal angles (as Figs. 14d-i shown) on the corresponding substrate surface;
- pretilt angle in one liquid crystal anchoring direction with respect to the corresponding substrate surface is substantially zero when the photo energy more than 6000mJ/cm (Fig. 4, col. 5 lines 30-32) or less than  $5^{\circ}$  that is in a range  $0-5^{\circ}$  (col. 1 line 35-36).

wherein

Claim 3:

- at least one of the liquid crystal anchoring treatments in the plural directions is a process for performing uniform anchoring treatment over an entire target area in each of the directions as shown (col. 2 lines 31-34).

Claim 4:

- at least one of the liquid crystal anchoring treatments in the plural directions is a process for dividing an entire target area into plural sub-areas corresponding to the plural directions and performing anchoring treatment in each of the sub-areas in the corresponding direction (col. 2 lines 14-20).

Claim 5:

- at least one of the liquid crystal anchoring treatments in the plural directions is a process for irradiating the alignment layer with linearly polarized light that can cause a chemical reaction on the surface of the corresponding substrate (col. 2 lines 21-27).

Claim 6:

- at least one of the liquid crystal anchoring treatments in the plural directions is a process for scanning the alignment layer with a probe that can impart stress to the surface of the corresponding substrate (mechanical rubbing with friction on alignment layers as shown in Fig. 11a).

Claim 7:

- at least one of the liquid crystal anchoring treatments in the plural directions is a process for scanning the alignment layer as Figs. 3 and 14a-j shown with UV light that can cause inherently a chemical reaction on the surface of the corresponding substrate.

Claim 21:

- the device is capable of maintaining of two of stable in-plane alignment state crystal (two domains) even after the removal of the applied electric field as Figs. 10a-b and 14a-j shown.

***Response to Arguments***

Applicant's arguments filed on 7/31/2006 have been fully considered but they are not persuasive.

Applicant's ONLY arguments are follows:

A liquid crystal cells have an in-plane switching mode but do not have interdigitated electrodes:

- (i) surface stabilized ferroelectric liquid crystal display devices (Clark),
- (ii) flexoelectric liquid crystal cell display devices (Patel), and
- (iii) field- controlled anchoring liquid crystal display devices (Jaegemalm).

Examiner's responses to Applicants' ONLY arguments are follows:

- (i) Clark discloses the surface interaction to suppress the antiferroelectric helix providing the stabilization of domains of opposite ferroelectric polarization separated by domain walls. Clark does not disclose either in-plane switching mode. Besides, in Figure 1, Clark device comprises Ferroelectric smectic liquid crystals (not nematic liquid crystals) between two apposed horizontal electrodes, which is with the applied voltage  $V(t)$ .
- (ii) Patel discloses "inner surfaces of cell are coated with transparent electrically conductive layers so that an electric field can be applied perpendicular to the plate and to helix axis", this means transparent electrically conductive layers formed on different substrates to generate an electric field perpendicular to substrates (plates). Patel discuss the Flexoelectric electro-optics of CLC. Patel do not mention the in-plane switching mode with nematic liquid crystal display.

(iii) Jaegemalm discloses "the switching of the optic axis occurs with a large component in the plane of the sample even though the electric field E is applied normal to the sample surface" as Fig. 1 shown. Only two opposing electrodes can generate the electric field E normal to the sample surface, thus Jaegemalm device is not a in-plane switching mode LCD.

However, this instant invention disclose the liquid crystal display comprising electrodes formed on bottom substrate to generate the electric field parallel to the surface of the substrates. Figures 7 and 9-10 show the arrangement of the electrodes EL1A & EL1B similar to the arrangement of the electrodes of a in-plane switching mode LCD. The device of invention is passive type LCD while a in-plane switching mode LCD can be active type LCD.

### ***Conclusion***

1. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of



Art Unit: 2871

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to HOAN C. NGUYEN whose telephone number is (571) 272-2296. The examiner can normally be reached on MONDAY-THURSDAY:8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HOAN C. NGUYEN  
Examiner  
Art Unit 2871

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ANDREW SCHECHTER  
PRIMARY EXAMINER